



# **RUBIK'S CUBIES**

**Note by Note Cooking Contest**

**By**

**Eugenia Ayebea Asamoah**

# Wondering what this could be



Ever imagined having a full course meal in one dish/plate?

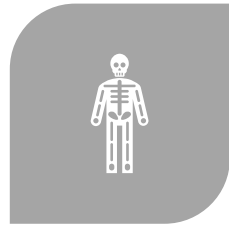


How about several options throughout the starter, main meal and dessert still in the same dish?

# The concept



A 3D  
combination  
puzzle of  
bewilderment



Connects and sparks the  
total human sensory  
experience



Designed in the form of a Rubik's  
cube serving a full course meal  
with tantalizing flavors



Made possible with the  
help of a key ingredient  
called **Pectin**

*A dish of simplicity and complexity; stability and dynamism*



# Breaking the ice...

A classical 3x3x3 Rubik's cube consist of:

- ❖ 27 smaller cubes comprising of 9 squares arranged in 3 levels
- ❖ But really 26 cubes as the very center cube is not exposed
- ❖ Over 43 quintillion possible combinations
- ❖ Only 1 solution



# Today's Menu



Starter



Carrot soup/Leek  
soup/Tomato soup



Main meal



Steak/Grilled  
asparagus/Mushrooms with  
Red wine

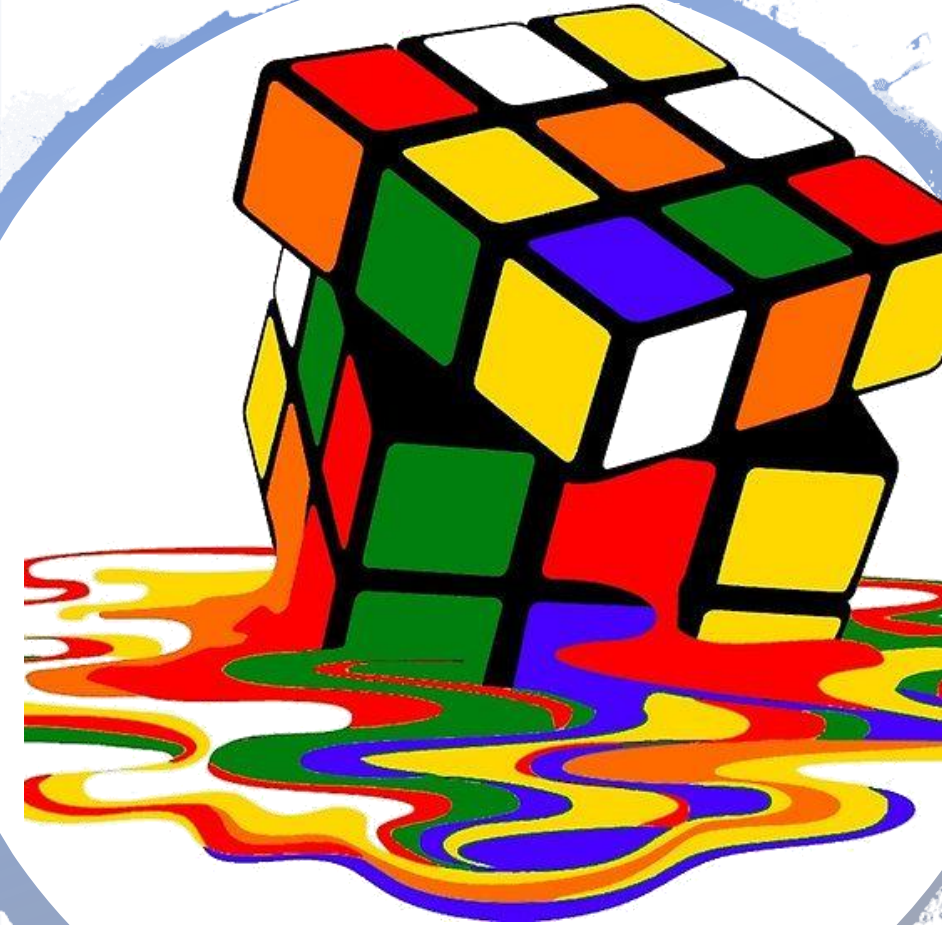


Dessert



Blue berry  
cheesecake/Strawberry  
shortcake/Lemon tart

# Creating Rubik's cubies



- A total of 27 cubes with 3 different flavors and colors for the 9 cubes within the 1st and 3rd layer of smaller cubes
- 2nd layer will have 4 different flavors and colors among the 9 cubes

# Formulation



Starter

**Base composition:**

- ❖ 3L of water
- ❖ 10% w/v (1:1) **HM Pectin** and **Na<sup>+</sup> alginate**

Main meal

- 
- ❖ 1L of base per layer

- ❖ Dimension per molded cube = 3.5cm<sup>3</sup>

Dessert

No sugar required for pectin/alginate gels  
(Thakur *et al.*, 1997; Steinnes 1975)

# Cubies Flavor Make-up

Cube Make-up	Flavor Ingredient	Amount (per 1L of base per layer)
Carrot soup	$\alpha$ -terpinene	200 $\mu$ g
Leek soup	3-ethyl-5-methyl-1,2,4-trithiolane	2ppm
Tomato soup	Cis-3-hexanol	80 $\mu$ g
Beef steak	3-methylbutanal and 2-heptanone	50ppm each
Grilled Asparagus	2-acetylthiazole	50ppm
Mushroom	Oct-1-en-3-ol	10ppm
Red wine	Epigallocatechin-3-gallate	800mg
Blue berry cheesecake	Benzaldehyde	15mg
Lemon tart	Citric acid	1g
Strawberry shortcake	4-hydroxy-2,5-dimethyl-3(2H)-furanone	200ppm

— Starter  
— Main meal  
— Dessert

\*Values are calculated based on the RDI per day of adults



# Cubies Color Make-up

Cube Make-up	Color Ingredient	Amount (per 333ml of base per layer)
Carrot soup	Sunset Yellow FCF <b>E110</b>	5mg
Leek soup	Cu-Chlorophyllin <b>E141</b>	200mg
Tomato soup	Allura Red AC <b>E129</b>	7mg
Beef steak	Carminic acid	100ppm
Grilled Asparagus	Cu-Chlorophyllin <b>E141</b>	200mg
Mushroom	Brown FK <b>E154</b>	200ppm
Red wine	Ponceau 4R <b>E124</b>	0.1ng
Blue berry cheesecake	Patent Blue V <b>E131</b> /Glycerol	250ppm/60µg
Lemon tart	Tartrazine <b>E102</b>	7mg
Strawberry shortcake	Allura Red AC <b>E129</b>	7mg

— Starter  
— Main meal  
— Dessert

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# Formulation sum up



Ingredient	Amount (%)
Water	85
Pectin	5
Na <sup>+</sup> alginate	5
Collective flavor compounds	2.5
Collective color compounds	2.5

# Bon appétit !!





# Several combinations possible

- ❖ Solving the mystery
- ❖ Experiencing gastronomic indulgence





**What would be your  
next combination of  
Rubik's cubies?**



# References

- Cho, I.H., Kim, S.Y., Choi, H.K. and Kim, Y.S., 2006. Characterization of aroma-active compounds in raw and cooked pine-mushrooms (*Tricholoma matsutake* Sing.). *Journal of agricultural and food chemistry*, 54(17), pp.6332-6335.
- Davidson, L. 2015. The Telegraph "12-things you didn't know about the Rubik's Cube, the world's best-selling toy." <https://www.telegraph.co.uk/finance/newsbysector/retailandconsumer/11745738/12-things-you-didnt-know-about-the-Rubiks-Cube-the-worlds-best-selling-toy.htm> (Accessed 24/10/19)
- FAO JECFA Monographs 5 2008, superseding specifications prepared at the 28th JECFA (1984), published in combined Compendium of Food Additive Specifications, FAO JECFA Monographs 1 (2005)
- de Castella, Tom. 2014. "The people who are still addicted to the Rubik's Cube". *BBC News Magazine*. BBC.
- Löfgren, C., 2000. *Pectins-structure and gel forming properties: a literature review*. SIK Institutet för livsmedel och bioteknik, Göteborg, Sverige.
- Mattia A; WHO's Safety Evaluation of Food Additives: Aliphatic Acyclic and Alicyclic Terpenoid Tertiary Alcohols and Structurally Related Substances (1999). <http://www.inchem.org/documents/jecfa/jecmono/v042je17.htm> (Accessed 25/10/19)
- Moliszewska, E., 2014. Mushroom flavour. *Folia Biologica et Oecologica*, 10(1), pp.80-88.
- Rohrig, B. 2015. Eating with Your Eyes: The Chemistry of Food Colorings <https://www.acs.org/content/acs/en/education/resources/highschool/chemmatters/past-issues/2015-2016/october-2015/food-colorings.html> (Accessed 11/11/19)
- Steinnes, A., (1975). Alginate in Lebensmitteln. *Gordian* 228-230
- Thakur, B. R., Singh, R. K., Handa, A. K. 1997. Chemistry and Uses of Pectin-A review. *Crit. Rev. Food Sci. Nutr.* 37 (1), 47-73
- Ulrich, D., Hoberg, E., Bittner, T., Engewald, W. and Meilchen, K., 2001. Contribution of volatile compounds to the flavor of cooked asparagus. *European Food Research and Technology*, 213(3), pp.200-204.
- U.S. Food and Drug Administration. Overview of Food Ingredients, Additives and Colors. Nov 2004; revised April 2010: <http://www.fda.gov/Food/IngredientsPackagingLabeling/FoodAdditivesIngredients/ucm094211.htm#qa> (Accessed 2/11/19).
- U.S. National Library of Medicine – National Center for Biotechnology Information, <https://pubchem.ncbi.nlm.nih.gov/compound/3-Methylbutanal> (Accessed 20/10/19)
- Van Ba, H., Hwang, I., Jeong, D. and Touseef, A., 2012. Principle of meat aroma flavors and future prospect. *Latest research into quality control*, 2, pp.145-176.
- William Fotheringham 2007. *Fotheringham's Sporting Pastimes*. Anova Books. ISBN 1-86105-953-1 pg. 50.